Boatlanding Bridge (Fairmount Avenue or Sixth Avenue Bridge)
Sixth Avenue, spanning Chadakoin River at the outlet of Lake Chautauqua
Jamestown
Chautauqua County
New York

HAER No. NY-167

PHOTOGRAPHS
WRITTEN HISTORICAL DATA

Historic American Engineering Record
National Park Service
Department of the Interior
Washington, DC 20013-7127

HAER NY, 7-JAMTO, 2-

HISTORIC AMERICAN ENGINEERING RECORD

BOATLANDING BRIDGE (FAIRMOUNT AVENUE OR SIXTH AVENUE BRIDGE)
HAER No. NY-167

Location: Sixth Avenue spanning the Chadakoin River at the outlet of Lake Chautauqua, City of Jamestown, Chautauqua County, New York. Bridge is 500 feet northeast of Route 394 and the railroad bridge.

UTM: N 4661950
E 644460
New York State Quad: Lakewood

Date of Construction: Contract signed May 1910, construction begun July 1910, bridge completed September 21, 1911.

Style: Two span, earth filled spandrel, reinforced concrete arch bridge with minimal ornamentation and concrete parapets.

Engineer/ Builder: Initial design proposal prepared by the city engineer in 1902. The 1910 design proposal was prepared by Richard Irvin, civil engineer and representative of the Pittsburgh, Pennsylvania office of the Detroit, Michigan-based Trussed Concrete Steel Company. Actual construction plans and specifications prepared by Edward C. Burns, a consulting civil engineer of Jamestown, and Clyde G. Jones, the City of Jamestown engineer. Constructed by Mahoney and Swanson Contractors, Jamestown, New York.

Present Owner: Chautauqua County, New York.

Present Use and Condition: The bridge displays some minor spalling. Overall, the bridge is in good condition. The bridge carries an average of 6,028 vehicles each day.

Significance: According to a New York State Department of Transportation bridge inventory, this bridge is one of the earlier reinforced concrete arch bridges in New York, as well as an example of a bridge using the "Kahn" system of reinforcement. The bridge was designed with some assistance from a civil engineer specializing in reinforced concrete construction, but was constructed according to plans prepared by local engineers not associated with a major consulting engineering firm specializing in the field of reinforced concrete arch design. The two span bridge built in 1910 is similar in configuration to the bridge first

proposed in 1902. The primary reason for building the bridge of concrete was the lower cost of reinforced concrete in comparison to an alternative steel truss design.

Materials of Construction:

Bridge uses forty-nine tons of the "Kahn" system of reinforcement. The Kahn system used longitudinal steel reinforcing rods with diagonal prongs to improve shear strength. Both round and square section steel reinforcement bars are used, but all bars are the "deformed" type. In plan, a horizontal row of steel reinforcing rods spaced one foot apart laterally for the full width of the bridge is placed at the intrados and the extrados of the arch. At both the intrados and extrados the longitudinal rods are connected by one-half inch diameter rods running transverse and spaced two feet apart laterally for the full length of the bridge. Vertical [shear] rods spaced at intervals of two feet connect the longitudinal rods of the intrados and extrados. The spandrel walls are 12 inches thick, and the concrete is 18 inches thick at the crown of the arch. A total of 4,000 linear feet of timber piling supports the reinforced concrete footings of the pier and abutments.

Dimensions:

A two span bridge with a total length of 158 feet. Each arch is 60 feet between spring lines. Bridge has an out-to-out width of 60 feet and a curb-to-curb width of 40 feet. The distance between the curb line and the exterior face of the solid parapet wall is 10 feet. Total deck area is 9,500 square feet. On each side of the bridge is a 7 foot wide pedestrian sidewalk. Each span has a rise of 10 feet 8 inches between the spring line and intrados of the arch. The single center pier is 20 feet 6 inches wide.

Major Alterations and Additions:

Since construction was completed in 1911 the bridge has required minimal maintenance and repair. The only notable repair has been the application of gunnite to the intrados of the arch prior to 1970.

Project Information:

The documentation of Boatlanding Bridge was prepared by the Historic American Engineering Record (HAER), National Park Service, during the summer of 1987 for the New York State Historic Bridges Recording Project. This project was sponsored by the New York State Department of Transportation under the supervision of Eric DeLony, Chief & Principal Architect, HAER. This report was written by Andrew Cole and Charles Scott. When citing this report, please credit the Historic American Engineering Record and the authors.

The Chadakoin River is a slow moving outlet for Lake Chautauqua and flows southeast through the City of Jamestown. A bridge has been at this site since around 1850. In the 1880's the city had a single span, ten panel, pin connected, through Pratt truss bridge erected at the site, known locally as the "Boatlanding" because of the adjacent Lake Chautauqua steam boat dock. In 1898, the truss was reinforced, and thereafter the bridge was frequently examined because of increasing deterioration. In 1902 the bridge was temporarily deemed structurally insufficient for the type of traffic crossing it. This traffic included heavy street railway cars and wagons laden with the raw materials and finished products of numerous adjacent table and furniture factories.

The Board of Public Works, after investigating alternative bridge types, recommended the construction of a concrete arch bridge reinforced with "expanded metal," at a cost of $18,700. The bridge was to be financed by issuing ten year maturity municipal bonds. The plans prepared at this time specified a two span, earth filled, reinforced concrete arch bridge with an ornamental stone or brick facade and a six inch concrete deck with brick pavement.

The opposition of seven of the eleven council members, including the chairman of the Bridge Committee, to the proposal to pay for the bridge with ten year bonds doomed the proposal to defeat.

In his annual report for the year 1902, the Mayor of Jamestown stated the issues of the case: "It cannot be doubted that a new bridge at the Boatlanding is demanded to accommodate and promote the safety of the traveling public. A recommendation of the Board of Public Works, dated October 20, 1902, is already before you, upon this subject, but providing for the payment of the cost by the issue of bonds for $18,000, [is] a method now impossible, even if voted by the taxpayers." The Mayor then recommended paying for the bridge from general tax revenues if authorized to do so by a special taxpayers election.

The issue of the bridge surfaced again the following year, but a bridge construction proposal was referred to a committee and once again no action was taken. The city engineer continued to urge that the condition of the bridge be "closely watched" and acknowledged that the bridge would soon need rebuilding.

No action was taken until after the bridge was deemed unsafe and temporarily closed in October 1906. The City Engineer concluded that the Fairmount Avenue Bridge could not carry the weight of Jamestown's new 30 ton trolleys and loaded wagons carrying freight to and from adjacent factories. The trusses were deemed sufficient for one 25 ton trolley only when no other traffic was on the bridge. As doubts to the structural integrity of the truss bridge grew, Clyde G. Jones, the city engineer, made a recommendation to repair the structure while planning for its replacement. His evaluation of the two options for a new bridge, a steel truss or a reinforced concrete arch bridge, produced estimates favoring the construction of a reinforced concrete arch

bridge. Jones calculated the cost of a single span steel truss bridge at between $30,000 and $35,000 as compared to $15,000 for a two span reinforced concrete arch bridge. After repairing the span the engineer reported that the bridge was "reasonably safe under the most favorable and judicious use," but advised that only one streetcar or heavy wagon be permitted across the bridge at one time.

The City Council, recognizing that the repairs were "only temporary at best," authorized spending $20,000 for a new bridge if approved by the voters at a special election. The election, held in April of 1907, resulted in the defeat of the bridge construction proposal.

Eighteen months later the issue of a new bridge at the Boatlanding surfaced once again when the aldermen adopted a resolution to investigate relocating the existing steel truss bridge to Winsor Street, the site of an even more deteriorated bridge, but where the traffic was lighter. Six months later this plan was abandoned and the Alderman instructed the city engineer to prepare plans and specifications for new bridges at both Boatlanding and Winsor Street. The design for the Boatlanding bridge was once again for a double arch reinforced concrete bridge of two 60 foot spans with a 60 foot width to accommodate a 40 foot roadway and two 10 foot sidewalks. The cost of the two-bridge project, however, had grown to an estimated $37,000. At a special election held on April 15, 1910, the public approved the bridge construction referendum. In May, bids were solicited and received from four contractors:

Reinforced Concrete Construction Co., Pittsburgh, Pa.
Nicola Building Co., Pittsburgh, Pa.
F. M. Roessing Co., Pittsburgh, Pa.
Mahoney and Swanson, Jamestown, New York

Mahoney and Swanson, the low bidder, was awarded the contract on May 31, 1910. The contract specified that the bridge would be completed within 110 days.

The initial plans for the concrete arch bridge had been prepared in consultation with civil engineer Richard Irvin of Pittsburgh, Pennsylvania. Irvin was the Pittsburgh representative of the Trussed Steel Concrete Company of Detroit, Michigan, the licensee for the "Kahn" system of longitudinal arch reinforcement. The Kahn "K trussed" steel reinforcing bar, as described by its advertising, was a "main horizontal bar with rigidly connected diagonal shear members." The cross section had "two horizontal flanges projecting at opposite sides" to provide rigid diagonal reinforcement against shear. During June of 1910, however, the City Council directed the Board of Review and Estimate to "dispense" with Irvin's services and "employ a competent engineer to furnish a detailed set of drawings for and supervise the construction of the Fairmount Avenue bridge." Engineer Irvin was replaced by local consulting engineer Edward C. Burns. Although Irvin's services were terminated, the bridge specifications drawn by Burns called for the use of the Kahn reinforcement system.

Burns was a civil engineer who had graduated from the University of Michigan and obtained extensive railway and river and harbor engineering experience, including employment in the design and construction of the Sault Ste. Marie Canal, before returning to Jamestown to open a consulting engineering practice. He served as a consultant to the Jamestown Board of Public Works and designed the steel truss Boatlanding bridge. The Fairmount Ave. concrete arch bridge was his last major project before retiring.

With the sale of the bridge construction bonds in September 1910, construction was clear to proceed. By September 1911 construction of the bridge was reported to the City Council to be "practically finished" and the contract was declared complete on September 21, 1911.

BIBLIOGRAPHY

Downs, John P., and Hedley, Fenwick Y., eds. History of Chautauqua County, New York and Its People. Boston: American Historical Society, Inc., 1921.

"Fairmount Avenue Bridge," Files of the City Engineer, City of Jamestown, New York.

Jamestown Evening Journal, October 21, 1902.

Mayor's Annual Message and Annual Reports of City Officers, 1898-1906. Jamestown, N.Y.: Fenton Historical Society, 1906.

Proceedings of the Common Council, City of Jamestown, New York.

National Association of Cement Users. Proceedings of the Seventh Annual Convention, New York. (December 12-20, 1910): 895.

New York State Department of Transportation, Bridge Identification Number 3362560 File, Region 5, Buffalo, New York.